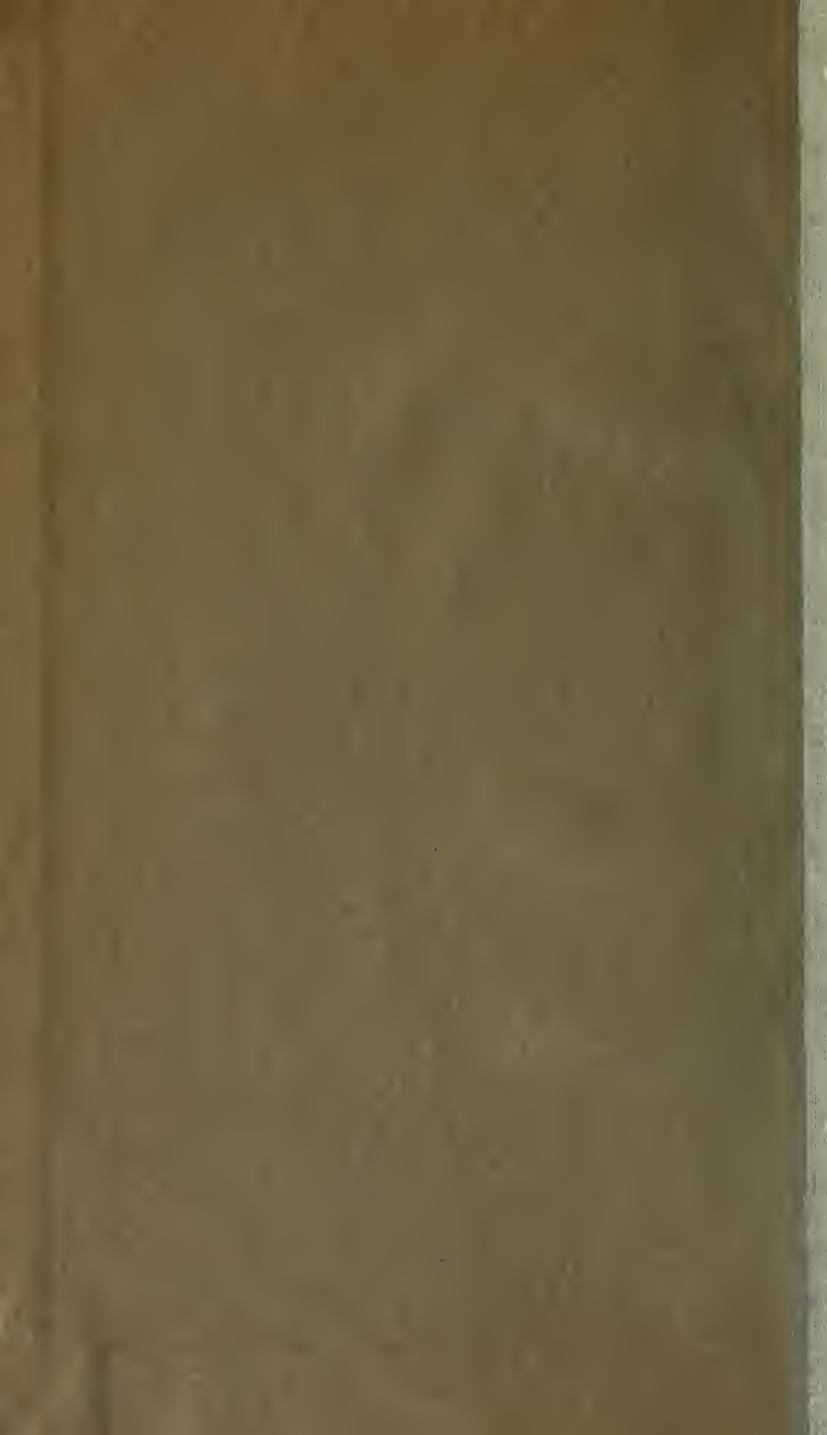


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FINANCIAL REFORM SCRUTINIZED,

IN A

LETTER

TO

SIR HENRY PARNELL, BART. M.P.

BY

GEN. SIR SAMUEL BENTHAM, K.S.G.

FORMERLY INSPECTOR-GENERAL OF NAVAL WORKS.

“ real Efficiency, which is true Economy.”

*Evidence of Sir H. HARDINGE, before the
Committee on Finance, 1828.*

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TO

SIR HENRY PARNELL, BART. M.P.

SIR,

THE very able and earnest manner in which you have treated many of the subjects discussed in "Financial Reform," whilst it excites conviction of the beneficial results that sooner or later must come from your observations, renders it the more to be regretted that in some instances the facts themselves, as well as the deductions drawn, are very questionable. The parts I particularly allude to, though not extending to the means of raising millions, have for their object the means of saving the need for some of those millions ; and it has appeared to me that those means stand the more in need of investigation since a nation, like an individual, must be the happier when its financial difficulties are remediable, not by any diminution of its necessities or even luxuries, but by a more economical mode of obtaining them.

Of the misconceptions that have presented themselves to me in some parts of Financial Reform, you have yourself,

Sir, assigned the cause, by observing, that “It is almost
 “impossible for persons, not themselves in office, to have
 “*sufficient knowledge of details* to be able to expose the
 “fallacies on which the pleas for expenses are enforced;
 “the only mode, therefore, that is left for making out a
 “case to establish the practicability of retrenchment is, by
 “reasoning on *probabilities*, founded on those facts which
 “are within the observation of every one;” to which you
 add, that “this is *necessarily* an *imperfect* kind of proof,”
 (pp. 105 and 106); and the candour with which you thus
 admit the deficiencies of your data, implies that you would
 have availed yourself of facts and details had they been
 presented to you. Having it in my power to supply you
 with some of these facts and details, I trust that in address-
 ing you on this subject, you will look upon me not as an
 opponent, but as a fellow-labourer, desirous of contributing,
 as far as in my power, such information, and to throw such
 lights on matters of Finance, as may tend really to alleviate
 the burthens on the country, without impairing its security
 and prosperity, present or future. On one account, at least,
 I hope you will regard me, too, as not an unqualified coad-
 jutor, since I was not merely long “in office,” but in an
 office which afforded me peculiar means of acquiring very
 ample “knowledge of details;” so that in endeavouring “to
 establish the practicability of retrenchment,” I have facts
 on which my statements rest,—facts for the most part re-

corded in official documents, to which reference will be made as I proceed.

The nature of my duties having been relative chiefly to the civil branch of the Naval Department, it is with reference to this department that my observations will be particularly directed; but, being founded on general principles, they are most of them equally applicable to the management of the civil branches, at least, of all other public concerns, an extent of application which will be occasionally pointed out.

PUBLIC ACCOUNTS.

OF the several subjects treated of in your Financial Reform, the one which presents itself as requiring to be the first noticed, is that of Public Accounts. The mischiefs arising from the imperfections of the present accounts are indeed expressed by you in strong terms, and as loudly calling for reform, yet my "knowledge of details" has led me to a conviction that the mischiefs in question are undervalued even by you, and are the more dangerous as many of them are concealed.

On this subject you observe (p. 186), that "In selecting the principle on which a reform of the present system of accounts should be grounded, it is necessary to take a much more extended view than the Commissioners whose

“Reports have been referred to were empowered to take.”

In the view which I have at different times been led to take of accounts, I never considered the field of my observations otherwise limited than by my faculties, and therefore I found it expedient and necessary to extend my views gradually from the receipt of the largest sums, to the expenditure of the smallest,—considering each sum expended as being paid in exchange for the acquisition of some article of the *matériel*, or for some service of the *personnel*.

In taking this extensive view of the subject, it appeared to me that the Treasury, as the name implies, is the money-receiving and the money-distributing department, the Bank of England its storehouse. It is the Treasury that is made acquainted with the annual revenue entrusted by Parliament to its care—to what amount, from what sources, and at what times to be received—to what purposes, at what times, and in what proportions to be applied. From the Treasury, therefore, information must emanate to the principal authorities of the several departments, as to what services will be required from each department; and what sums will be at their disposal for the obtainment of the personnel and matériel requisite for those services, distinguishing the periodical allotments, weekly, monthly, quarterly, or yearly, as may be deemed proper.

It is not my present purpose to enquire into the collection of the revenue, nor to trace it on receipt farther than

that I suppose it advantageous that, as collected, it should as soon as possible, according to the case, be deposited in the Bank of England, or its subsidiary Banks, and by the intervention of as few persons as possible.

Referring, therefore, now to the civil branch of the Land or of the Sea Service, both of which may be considered as constituting the War Department, the ends desired to be attained by the accounts kept in this branch, as indeed, in all others, relative to the expenditure of public money, are as follows :—

1st. To exhibit clearly to view for what article of the matériel, or for what service of the personnel, each distinct portion of the public money has been paid.

2nd. To show whether the public treasure, including the store of matériel—money's-worth—as well as of money in the form of cash, has or has not, at any time, and at all times, been applied according to the destination assigned to each portion of it, by the superior authority.

3rd. To afford the most efficient checks to misapplication, waste, and theft, in regard to money's-worth, no less than in regard to cash.

4th. To bring to view how far any given quantities of similar articles, or given amounts of similar services, have been obtained at a greater or lesser cost, as obtained by the different means, and in the different manners, which have been resorted to, at different times, in different places, and under the management of different persons.

And 5thly, to effect these purposes, it is essential that the forms of all accounts, and the manner of keeping them, should be such as that for the performance of the several operations,—from the first registering a fact to the making the last general abstracts,—the least degree of skill, as well as the least consumption of time, and consequently the least expense, should be required. Moreover, the form in which the accounts are kept should be the best suited for reference; the language should be the most intelligible to persons of all description.

Considering that money's-worth, no less than money, should be the subject of public accounts, and that the loss by extravagance, misapplication, waste, embezzlement and theft, in relation to a number of articles of the matériel, far exceeds any losses that have been sustained by the public in the form of cash, it will appear that the actual transfer of cash from hand to hand, which seems the subject to which most attention has been paid, is but the secondary and very inferior consideration, in regard to the savings to be effected by reform.

The place where money, like any other valuable commodity, is kept, requires to be a place of safety, and we must suppose no want of security either at the Treasury, or at its storehouse, the Bank of England, where alone all money for public use in the metropolis may most conveniently, as well as securely, be kept. The delivering out of money for different payments, might then be effected

in the same simple and satisfactory manner in which private persons make their payments. Yet in this, as in other objects of investigation, instead of beginning it at the Treasury, from whence the money is supposed to come, the eligibility of the requisite arrangements will be more clearly traced, by beginning with the employment of the money in payment for services or articles for which money-payments are required. Take, therefore, for example, the work performed in a Dock Yard, as a service with which I am most familiar, and the payments for which may well serve as an example, as they relate to a very great variety of articles of the matériel, as well as services of the personnel, consequently the greatest difficulty, if there be found any difficulty, in making out the accounts.

In a Dock Yard, the payment to one description of the personnel has to be made on the spot; great part of the payment is for quantities of work done, at rates according to regulations, and in amount according to calculations made by authorised accountants, of the quantities registered on the spot—the remainder is at a certain rate by the day. To effect security in regard to these payments, it does not seem requisite to have any further complication than that one calculation should be made by the responsible master workman of any branch of business, of the wages earned by each person under him, within the preceding week; whilst at the same time, as the most effectual check, the data having been daily sent to a different place, to remove

all doubts of collusion, say, to the Accountant Office, in Town, a similar calculation there made, from the same data, might be transmitted to the Chief Accountant's Office, at the Dock Yard, who would compare the total thus sent him, with the total made out in the master workman's account, and should he find these totals to agree, would authorise the payment of it by his signature to the master workman's account. On the receipt of this authority, the local Cashier would pay into the hands of the master workman the amount, either in cash, or by a draft on the local bank, for which sums he would receive the master workman's receipt; a simple receipt being the most usual, the easiest, as well as the legal voucher of payment in all private concerns throughout the kingdom. The master workman, or a distributor chosen by the workmen themselves, having thus obtained the cash, would distribute it in the portions due to the several workmen under him; their silence on the subject of pay, after the known customary time of distribution, being in regard to them considered as proof that they had been duly paid. This mode of payment I first introduced in the three manufacturing establishments at Portsmouth, begun and carried on for many years under my direction.* The wages

* On this first occasion of mentioning the three new establishments in Portsmouth dock-yard, I must observe that they were withdrawn from all influence of the system of official aggregate management. The

were thus paid weekly, sometimes to the amount of about 5000*l.* a year, amongst about ninety or a hundred operatives, by the master of the metal mills, after working hours; and payments were made in the same manner in the two other of those establishments, the wood mills, and the millwrights' shop, during the whole time they were under my management. I understand that, conformably to my former recommendation, and to the example thus afforded, all the artificers in the Dock Yards are now paid in the same manner; I should add, that during the whole time those establishments were under my direction, no instance of difficulty, inconvenience, or loss of any working-time, resulted from this mode; when by the former mode, besides the whole extra expense of pay-clerks, the value of the operatives' time lost on pay days only, in the Dock Yards, did not amount to less than 1000*l.* a year.*

This example is brought now to notice, because I feel assured, from the investigations I have entered into, that not only all money payments in the several departments at the naval arsenals at the out-ports, and in town, but the pay-

Navy Board happened to perceive that under that management, and by means of the persons subject to their order, the businesses in question could not be introduced; and though a Board, they in this instance informed the Admiralty that they saw no alternative to the putting them under my sole management, subject only to my individual responsibility.

* Naval Papers, No. 8, page 11.

ment of all seamen's wages, may likewise be effected as easily, without any need of pay-clerks, or others in their lieu, or of the more costly accounts kept of the payment to seamen, marines, and all others. The purser might in this case pay the money, with any detention which might be required, according to regulation; and his accounts might be carried on weekly with little more trouble than he is now obliged to take for noting articles he has to furnish continually to seamen;—and as to the *rating* of seamen, that is the determining in regard to each man, whether he be entitled from his intelligence, good behaviour, or otherwise, to be paid the high pay of able seamen, or whether he should be classed as an ordinary seaman, or as a landsman, the checks on this classification seem to require that it should be, as I believe it still is, placed in other hands, as noticed in Naval Papers, No. 3, pages 19 and 20.

In regard to claims of payment for all articles of the matériel provided for naval service, this business, now so complicated, might likewise be much simplified, and as easily effected, by reducing it to the manner in which it is practised by private individuals in their own concerns, domestic as well as mercantile. The merchant who supplies a commodity should himself, from his own data, make out his bill of articles supplied, specifying the quantities and rates, and should present it to the accountant-officer, who having examined the quantities as received by the store-keeper, seen that the rates were conformable to agreement,

and the calculations correct, might sign the account in testimony of its correctness; he would then deliver it to the merchant, who, on presentation of the account thus certified to the cashier, would receive from him such a cheque on the Bank as an individual draws upon his banker. The merchant's receipt would likewise in this case, as in private concerns, be the simplest and only legal voucher necessary, or expedient, to ascertain that the money had been paid for the article so authenticated.

A check, however, would evidently be necessary on the cashier, otherwise he might draw upon the Bank, cause money to be received, and carry off the amount. The simplest check would be that an account, specifying the amount of all bills examined in the course of the day, should previously to their payment be sent daily by the accountant to the Bank, specifying the name of the person to whom due, together with that of the cashier on whose cheque it would be to be paid, and making it necessary that no cheque should be paid, the amount of which did not agree with this notification previously received from the accountant. This arrangement need not necessarily cause delay beyond that of one day in payment of the cheque; but by making an interval of three or four days necessary, it would admit of a further check before payment, where expedient, as I shall hereafter mention. A delay of this extent it is true, short as it is, would be a loss of interest, and a want of capital to the merchant for so many days; but

compared to the delays that are frequently experienced by the present mode, the merchant would in this respect have no reason to complain. It is not necessary to my present purpose to enter more fully into all the details which might be requisite to prove the practicability of this mode, by going through the whole payments of the navy, to reduce them to this simple plan; but from general investigations, as well as from actual experience, I am induced to affirm with confidence, that they might all be effected in the same simple, expeditious, and unexpensive manner.

Payments to be made in cash at establishments distant from town, would be to be provided for on the same principle. It would depend on the pecuniary conditions that might be made with a local banker, whether it would be most economical that the cash should be furnished by him, or that it should be sent periodically from the Bank of England; that is to say, the sum beyond the amount which the tax receivers of the district might pay into the coffers of the local bank, as is practised in France, instead of sending it to town. That unnecessary expense is now incurred in sending money, as you say, "in waggons, under officers, " called conductors," cannot be denied; but that this method is as "antiquated and absurd a practice," may, on a recurrence to facts be doubted, as I have known in the instance of a distant private manufactory, that it was found by the proprietor cheaper to receive money for the weekly payment of above two thousand persons by means of a waggon from

town, than to take it from a banker on the spot; I can conceive that it might possibly turn out the same in regard to Government; and should that be the case, there might probably be found a less expensive mode of transport on Government account than that at present resorted to; at least it would seem that where a military escort is afforded, there could be no need of civil officers as conductors.

Supposing the Bank of England to be looked to as the only store-keeper of the public money, many minor arrangements would appear advisable for the convenience of this establishment, no less than of the public. Such for instance, as branch banks, at the great naval and military arsenals and depôts, probably a branch at the west-end of the metropolis, for the payment of small sums particularly—and it must be inferred that if private bankers find it worth their while to take upon themselves the trouble of small payments alone on private account, the whole concern on public account, of bankers-general for the whole of the public money, could not but be much more advantageous to the Bank of England. The approaching renewal of the Charter of the Bank might afford a fit occasion for making such an arrangement.

The cashier so charged with drawing on the Bank would, no doubt, in public estimation be considered as an officer of high trust, his salary would therefore be ample, his place honorable, so that individuals in that rank of society to which the public are in the habit of looking

as most fit to be charged with such a duty, and in which ministers are in the habit of placing confidence, would be desirous to accept it, although it would be a place requiring constant attendance on the duties of it. Besides which, a degree of security, in regard to the money-trust reposed, might be obtained far beyond what is usual, by adopting in this country a precaution taken in France, in regard to all public officers entrusted with the receipt or payment of government money; that is, requiring the officer to give security to the amount thought requisite—not the vague security of personal friends, engaging to be answerable for deficiencies,—but a real, never failing, and immediate security, namely, the depositing, on their appointment to office, a certain large sum in the public funds, the interest of which they duly continue to receive so long as they are honest and correct, but the capital, or the requisite part of it, becomes the property of government in case of defalcation.

The same security might be required wherever security is desired and necessary, in the case not only of cashiers, but in that of storekeepers, and of all others in whose hands it may be requisite that money or goods should be deposited. An objection that might be made to this mode of obtaining security, might proceed from an idea of hardship on the persons appointed cashiers, if they had not a sufficient disposable capital of their own. But in answer to this, it must be observed, that no such difficulty is experienced in France; money is always to be borrowed by

private persons on good security ; and it may be added, that a man whose probity is doubted by his private friends, can hardly be considered as a proper person to be entrusted by Government.

At the time when your Committee was sitting, I entered into various details, with reference to the above mentioned outline of a general mode of paying money and keeping accounts, in the expectation of being called to give my evidence, as I had been formerly by the Committee on Finance in 1798. It appeared to me, in consequence of that investigation, that the adoption of such a plan would do away the need for the greater part of the treasurers and paymasters of different offices, and of a great number of clerks, as there need be but one cashier-general for each of the grand divisions of public concerns ; and for money itself there need be but one storehouse, the Bank, in the metropolis, and its branches in the country, in which money for the use of every department need be kept.

It will be seen that, in regard to money itself, the same as in regard to money's worth, I place more dependence on a single signature than on a plurality of signatures, however made up. That plurality of signatures, besides being superfluous and expensive, is not efficacious in regard to so simple a transaction as that of authorizing the quarterly payments of salary to an officer, was proved even in the instance of my own office, few as were the persons of which it consisted. It happened that salary bills, in the usual

form, and authenticated by the Navy Board as usual, by a plurality of signatures, were made out to the person who had held the place of architect, for three following quarters after that in which I had given official notice of his death; and after the same Navy Board had, *in the same manner*, authorized the payment to the widow, as his administratrix; of the arrears of salary due at the time of his death. All these bills for money due, and money not due, were sanctioned as usual, and were in the same manner sent successively from the Navy Office to my office.

In another instance in my office, the Navy Board wrote, requiring the salary bills of the metal-master for a twelve-month back to be returned, the Board entertaining an opinion that they had made out bills for the payment of salary to this officer for a year after he had been dead; whereas in this case, the officer in question was still living, and had regularly received his salary quarterly, by means of his own signature added to the bills demanded back, and which having been regularly made out, must necessarily have received the joint signatures of the Board.

On the Navy Board's requiring me to send back to them the bills erroneously made out to the deceased architect, I took the opportunity of calling the attention of the Board to the superior efficacy of a common receipt, the substitution of which to their joint signatures to salary bills, was one of the items of reform I had it in view to propose should be carried throughout the whole Naval Department,

as I had already introduced it relative to some transactions in the Dock Yards. Not that blame can in this respect be attached to the individuals composing the Board, for I know well, from my own experience whilst a member of that Board, that after a long morning of occupation by business essential to the public service, a large parcel of papers were frequently brought in for signature, when there was no longer time for their perusal, or even to enquire into the subjects they referred to. These papers were nevertheless always necessarily signed by three of us, each one supposing that one of the others might know something of the matter.

I have therefore no hesitation in affirming, that the whole business of making out salary bills, like many other parts of the routine of business which is made to occupy the time of officers receiving great pay, however much it may serve to add to the apparent importance of their duties, is altogether time, and consequently expense, thrown away.

In judging of the fitness of the manner of keeping accounts of public expenditure, it has of late been very usual to refer to the manner of keeping them by individuals in their private concerns; but in making this reference, it has been more in regard to the form, (which I shall consider farther on, under the head of book-keeping) than to the use of accounts, or to the matter that should enter into them, to which attention has been paid.

In considering the several items in private accounts, which it may be proper to introduce into public account keeping, it seems, in the first place, necessary to keep in mind a circumstance that appears to have been much overlooked; namely, that there are essential differences between the objects of public departments and those of private merchants or manufacturers. The ultimate object of the private concern, is that of producing profit as measured by money. The effects which it is the ultimate object of public concerns to produce; however valuable they may be, or essential to the prosperity and even existence of the country, and however desirable it may be that a money value should be set upon them, yet they are seldom expressed by a measure in money. The private proprietor of any concern, employs the capital under his command with no other end in view than that of encreasing his profit; all the accounts of private concerns must be supposed, therefore, to be so arranged as that the last abstract should exhibit the profits or loss resulting from the concern, in *money*: whilst on the other hand, in a public concern, the capital being employed in producing the *effects* above mentioned, the accounts must be so arranged as that the last abstract should exhibit what *effect* has been produced by means of the expenditure of a certain capital.

The merchant trading with a capital of £100,000, possesses at the end of the year, over and above the return of his capital, a surplus or profit, suppose, of £10,000. The

Naval Department, with a capital of £100,000, has, by the end of the year, exchanged that capital for various items, which have, for instance, entered into the composition of a ship of the line, fitted, rigged, and armed ready for sea. In the mercantile concern, good or bad management will be shewn by the quantity of money that has been produced over and above the capital employed; in the public concern, good or bad management will be shewn by the comparatively lesser or greater sum of money that has been expended for the obtainment of the ship of the line.

In regard to the matériel, Government takes the place of a merchant, or that of a manufacturer, according as the articles are purchased ready made, as for instance, a complete ship, built, fitted, armed and rigged, ready for use; or as the materials, previously purchased in a greater or lesser degree of preparation, are afterwards manufactured into the different articles of which the ship is composed, or combined together so as to form the ship ready for service. In as far as concerns this merely mercantile or manufacturing part of Government business, the details of public accounts should be composed of the same items as enter into the accounts of a private concern; with this difference, however, that whilst the private account shews the difference in money between the prime cost and the produce or sale price of the article bought and sold, or manufactured and sold—the Government account must shew whether the cost

of the article purchased or manufactured, exceeded or fell short of the cost of the same article obtained by any other means. This will be exhibited by a comparison of the accounts of the different modes in which the same article has been obtained at different times, in different places, under the influence of different circumstances, and under the management of different persons. In this view it appears that Government accounts have, in regard to subordinate transactions, to keep account of most of the items which enter habitually into a manufacturer's or merchant's accounts; whilst the abstracted accounts, as they ascend from the inferior branches to the highest, must essentially differ from mercantile accounts. Instead of mere *profit and loss*, indication must be given of effects produced—absolute expenditure compared to efficiency—and consumption of time in the production of effects, with a view to the several objects of efficiency, economy, and dispatch.

On referring to the accounts of private individuals, it will be seen that several items which enter habitually into a manufacturer's or merchant's accounts, and though equally necessary in the case of public accounts, have not, however, been attended to in government accounts, nor have they been noticed by those who have referred to private accounts, as standards of perfection. But, as example is more valuable than bare assertion, some of those items shall be adduced, beginning with that very important item, interest of money.

Interest of money is an item which is well known to enter regularly and habitually into the calculations and accounts respecting all mercantile and manufacturing transactions; but which, in regard to public expenditure, in the instance of the Naval Department at least, and I believe equally in that of other departments, seem not to have been noticed; excepting indeed occasionally relative to cash in the hands of treasurers and paymasters, and sometimes where government have had to pay interest for money advanced on account. Whatever be the amount of capital which any private individual employs in the carrying on of his concerns, whether it be capital originally embarked in the concern from his own resources, or borrowed for that purpose from others, he does not fail to estimate interest, the yearly rate of which in this country, may on an average be said to be at 5 per cent.

In regard to public concerns carried on by government, the greater part of the sums requisite are borrowed, and the services on which public money is expended may occasionally be considered so necessary, that the requisite capital must be obtained even at the rate of 8 or 10 per cent., instead of 5. On ordinary occasions, it is true, public credit is so good, that capital can be obtained at a less rate of interest than that at which private individuals can obtain it; but still an interest must be paid, and the paying this interest for a longer time than necessary to effect the pur-

pose for which the capital was raised, is evidently so much loss.

This loss, as existing in public concerns, will be found to be immense; it is a loss which I first exhibited to the view of the superior Naval authority so long ago as the year 1796; I also indicated it to the Committee on Finance in the year 1798, who seemed very sensible of the importance of it; and I have not failed to endeavour to draw attention to it by the indication of losses, and display of savings, dependent on interest of money, on every occasion that presented itself, down to that of my last official statement in the year 1813.* Nevertheless, as no published accounts had, nor as far as I have been able to learn, have ever been kept to shew their loss, it seems expedient to enter into some details, for the purpose of bringing to view the influence which this important item has on public expenditure.

Taking, for example, the effect which the value of interest has on the expenditure on what are called public works. So long as the commencement of any given work is delayed, and consequently the expenditure of money upon it, so long, it is evident, the public may be spared taxes, to the amount of the interest on the capital required for the execution of such work—but on the other hand, it may be supposed that no work would be undertaken of which the annual value, when completed, would not exceed the annual rate of in-

* See Naval Papers, No. 8, page 18.

terest on the capital sunk upon it. In this view an attention to economy would require that where a work is wanted immediately, its commencement should be immediate, its execution carried on as rapidly as the nature of the work itself admitted of; and where it is not wanted before a given future time, it should not be begun upon till the latest time from which its completion might be effected so as to be ready at that future period. No such rules have, however, been attended to. On the contrary, permanent works, civil-engineering works for example, have been habitually carried on a little one year, a little the following, and so on, little by little, for a great number of years. In the instance of a great work carried on in this way in Portsmouth Dock Yard, the whole cost, as it appeared in the books, amounted to no more than 591,821*l.*; but it was proved, on calculating the interest that had been paid upon this sum during the many years that elapsed between the commencement and completion of the works, it had amounted to the additional sum of 233,140*l.*, making the real cost of the works not merely 591,821*l.*, which appeared on the books, but really the much greater sum of 824,961*l.*

In order to shew how little, even now, such losses are attended to, or avoided, and how easily retrenchment might in this respect be effected, I will refer to examples afforded by the navy estimates of the present year.

The first article of the extra estimate is 40,000*l.* for en-

larging the basin, and repairing the mast-pond at Woolwich, but of which sum only 16,000*l.* is demanded for this year.

Without knowing particulars of the plan of this work, my experience makes me feel assured that the whole of a work of this nature, to the amount of 40,000*l.*, might with facility be executed in a single year. If, as must be supposed, from the fact of its being ordered, the works in question at Woolwich are wanted, and consequently of a determinate value to the public equal to, or surpassing, the amount of the sum appropriated, the delaying its completion unnecessarily is foregoing the value of it for that time. Reckoning the money sunk at no more than 5 per cent. on the capital, the loss for want of the work would be two thousand pounds a year, until it be completed for use ; thus, supposing the unnecessary delay to be no more than a year and a half, the loss upon this work, which might be now avoided, would amount to 3,000*l.* If on the other hand the works are not wanted now, and will not be for two years and a half to come, by forbearing to commence the works for a year and a half, putting the 16,000*l.* to be expended on it this year, and the 8,000*l.* to be expended the first six months of next year, out to interest as received, the interest at the end of a year and a half would amount to about 1,600*l.* in addition to the capital of 24,000*l.*, so that the sum remaining to be taken in the last year from the public

would be but 14,400*l.* instead of 16,000*l.*, and yet the works would be ready for use at the same time as if proceeded with as at present.

The second article in the same estimate, "Plymouth Sound.—For completing the works of the Breakwater, and building a Light-house, 42,000*l.*"

This work, if completed this year, will have been in hand twenty years. The total sum expended upon it has not appeared in any public document of which I am aware. There has, however, appeared every year successively, in the extra estimate, one item in regard to it, that of the sum wanted "for completing the work;" another item, "the sum that may be laid out during the year," and further, from year to year, the sum voted the preceeding one as what "might be laid out," has been deducted from that part of the total estimate which appeared the preceding year; the remainder has been set down as the sum still necessary for completing the work. Thus, on the estimate, the real expenditure does not appear, any more than the variations which in the course of twenty years must have taken place in regard to the amount of the original estimate.

This work of the Breakwater has probably cost, from first to last, and including all contingent expenses, about two millions. I have no means of knowing the exact sum, but as an example, this sum of 2,000,000*l.* may be taken, whether the real sum may have been two or three hundred thousand pounds more or less. Suppose this expenditure of

2,000,000*l.* to have been equally spread over the twenty years, the amount expended in each year would be 100,000*l.*—it might have been, in fact, less during the first years, and has been again less the latter ones, but in as far as interest is concerned, for the facility of calculation, it may be considered as having been spread equally—the interest on 100,000*l.* is 5,000*l.* per annum, adding this interest to the 100,000*l.* spent the first year, as also the 100,000*l.* expended the second year, and so continuing to compound the interest upon capital expended, adding annually to the capital sunk 100,000*l.*, it will be found that at the end of twenty years, the work will have cost, not the nominal two millions, but in point of fact 3,306,595*l.* 8*s.* Supposing this work had been capable of being executed, from commencement to completion, in a shorter time than twenty years, say five years, the amount of the real cost of the work, two millions, being as before taken as the nominal expense of it, would then have been, including interest, no more than 2,210,252*l.* 10*s.* ; so that on this single work an attention to the value of interest on sums expended, would have saved to the nation no less a sum, in round numbers, than a million. The loss the public was sustaining for want of the work, which if eight per cent. be a reasonable estimation for justifying such expense, would have been 160,000*l.* a-year, so long as the obtainment of the use of the work was delayed.

Other considerations, some that apply to all works, some

only to peculiar works, might also have rendered it advantageous to have hastened this work—such as to save payment of superintendence, a costly item in this work, but the persons employed for which needed not, as to the more expensive ones, have been increased, however expeditiously the work had been carried on; and in a work of the nature of the one in question, the great risk, during execution, of damage in consequence of storms, entailing extra expense, should of itself point out the advantages of expedition. Had the attention of those who ordered the work, or of those who had part in its direction, been called to the amount of interest on the capital expended, or to the amount of the value of the use of the work, by which the authority for executing it must have been grounded, the question, it can hardly be doubted, would have arisen, of whether it should be begun, as it was, in the year 1811, so soon as it was decided on, and carried on with all possible expedition; or whether, the collection of the money being then commenced, it should, as received, be laid by at interest, till the time should arrive, a few years later, when although the obtainment of the value of its use had been postponed, the capital thus collected and increased by interest, should enable the work to be begun and carried on to completion, so as to have diminished the actual expense of its obtainment by a third of what has been its real cost.

The third article in this year's extra estimate is the

Chapel at Pembroke, estimated 4,000*l.*, this year's grant being 2,000*l.* of it.

It is evident, a half-built chapel would not be used, and there seems no doubt that one year, if not half-a-year, might suffice for its erection. The rent upon a chapel costing 4,000*l.* would, at five per cent., be 200*l.* per annum, if at eight per cent., 320*l.* If Government be now paying only 200*l.* a-year for the hire of a chapel, the next year's rent will necessarily be so much loss incurred by the non-completion of the new one this year, as also a further loss of the interest, 100*l.* on the money spent on the work this year. If Government pay no present rent for a chapel at Pembroke, and suffer no inconvenience from the want of one, although there be a chaplain, then the loss is no more than the 100*l.* interest on the money advanced this year unnecessarily.

On the other hand, to shew the advantages, in point of economy, actually derived, in the instance of private works, from dispatch in their execution, the St Katharine's Docks afford an example the more appropriate, as the capital spent, about two millions, is the same as that laid out on the Plymouth Breakwater. The capital was subscribed for the Docks in July 1825, nearly two years were spent in preparations, such as purchase of the scite, pulling down buildings, &c.; the first stone was laid in May 1827, the whole work is expected to be completed by next May; thus the whole time spent upon this work will have been

less than five years; and the whole cost, including interest at five per cent., as I have reckoned in the case of the Breakwater, will have been the above-mentioned sum of 2,210,252*l.* 10*s.*

If the construction of these Docks had been, as in the case of the Breakwater, protracted over a period of twenty years, besides the actual cost which would have been increased from the above sum of 2,210,252*l.* 10*s.* to that of 3,306,595*l.* 8*s.*; the Company would, moreover, have been deprived of fifteen years' earnings, which reckoning at only 5 per cent., would be 100,000*l.* and reckoning, as may fairly be done in this instance, at 8 per cent., would amount to 160,000*l.*

There seems no need to go on with other examples. Whether the expenditure be of hundreds of pounds only, or of millions, by delay of the work, if wanted immediately, or by a too early commencement of it when not wanted till a future period, or when money cannot be obtained for it but by dribblets, the loss must always be in proportion to the capital, and to the untimeliness of its expenditure. This loss is therefore an item which it appears necessary to bring to view by the accounts of public expenditure, as a very efficient means of reduction, whether as a guide to Ministers in asking for grants, or as satisfactory data to the public in according them.

It was in conformity to this principle, that with Earl Spencer's approbation, after ample discussion, I prepared the extra estimates, for architectural and engineering

works, in the years when I was looked to for them. No money was then called for, nor expended upon a variety of these works, which had been formerly carried on little by little, from year to year, but the whole money likely to be granted, and the whole efforts of the contractor likely to be obtained, were assigned exclusively to the one work, then considered the most important because promising the greatest annual savings, namely, the providing the deep basin and docks in Portsmouth Dock Yard.*

But it is not only in regard to permanent works, of the nature of those brought as examples, that the importance of taking interest into account may be seen. It influences on the purchase of all stores. An article originally purchased at a cheap rate may, on account of the loss of interest on the prime cost during the time it is kept on hand, bring it at length to a very dear one. It is a calculation particularly requisite in time of peace, in regard to all stores capable of being expeditiously manufactured in our arsenals, or of which a supply might be found in the market on the breaking out of war, although at a dearer rate—it influences materially on the eligibility of one or another mode of seasoning timber†—it points out the economy of

* Naval Papers, No. 8, p. 49.

† The expense in interest of money, in seasoning the quantity of timber and plank requisite for a first rate, according to the present mode, amounts to about 7,000*l.*; whereas by another mode of seasoning timber, this expense might be reduced to less than 1,400*l.*, making a difference in

making use of every accommodation and article of public property, in time of peace, wherever any collateral use can be found for them, that would pay interest on the capital and wear and tear of the article in question.* In short, it has seemed unaccountable, that an item so constantly attended to in private concerns, should have escaped the notice and animadversions of the many persons competent to judge on this particular, amongst those who have interested themselves in matters of finance, and the more so, as savings in point of interest are attainable without diminution of the income or comfort of any individual.

Independently of interest, there are many other items not usually taken into account, and by the omission of which the accounts cannot exhibit the real and whole cost of—perhaps I might say—any article of the matériel, or service of the personnel. Taking for instance, the accounts of timber, even when price is mentioned, no additions are made on account of the expense of receipt and storing; of rent of the ground on which, or buildings in which, it lies to season, or is kept for security; of loss by decay or otherwise, during seasoning or keeping in store; nor often of the cost of freight, especially on transport from one arsenal to another. Some of these items may indeed be too small in amount to the cost of the timber for such a ship, of about 5,600*l*. See Naval Papers, No. 6, page 25; No. 8, page 18.

* See United Service Journal, for Jan. 1830, page 41, on the employment of Government vessels for the transport service.

be worth the expense of reckoning in regard to each single article, still it is necessary to draw attention to even these, by adding a percentage on the original price. Indeed, on referring to Naval Papers, No. 2, page 65, it will be seen that in one instance at least, owing to the total disregard to the price of carriage, four shillings a load more was actually paid for the carriage alone of timber from one of the King's forests to Portsmouth Yard, than the established price at that dock yard to timber merchants for furnishing such timber, "purchase-money, profit, carriage, and all "other expenses included." On the occasion of bringing that transaction to the notice of the Admiralty, what I pointed out as most worthy their Lordships consideration was, that "in respect to so important a branch of duty "as that of the providing stores for the use of his Majesty's dock yards, whatever may be the mismanagement, "the duties of the persons concerned are so ill defined, and "their instructions so insufficient, that there is no one individual on whom the blame can be fixed." I had already said, that "it would appear, on a full investigation, that "abuse and mismanagement had been the natural consequence of defects in the system of management;" and I added my persuasion that, "when the accounts of all transactions shall be kept in such manner as to bring their comparative economy to observation, all such abuses "would in future cease of course."*

* Naval Papers, No. 2, page 59.

In regard to the cost of permanent works, the accounts do not specify regularly and uniformly, if ever, the time at which the money is expended on a work, nor the time when it is completed ready for service, nor the time when confided to those who are to make use of it, nor the expense of maintaining it in a state fit for service.

For the remedying all these defects, which I consider to be of no inconsiderable importance, I had proposed new forms of accounts, as well as arrangements for abstracting them and bringing them up.* As an example to shew the need of these proposed accounts, in point of economy, and of paying attention to the particulars above mentioned, the deep basin and docks in Portsmouth yard may afford an instance the more relevant, as it was in regard to these works that, in conformity to my proposals, the Admiralty were pleased to give orders that accounts should be kept, such as should excite attention to the putting these works to the fullest use, but which order was however evaded.

The expense, to be incurred for the enlargement and deepening of this basin, according to my plans, together with the construction of two deep docks within it, and the formation of three long jetties, was 231,000*l.*, but for the sake of facilitating calculation, say the round sum of 300,000*l.* This as a private concern, to be a beneficial

* Naval Papers, No.3, pages 135, 113 to 119, 125 and 6 ; No.8, pages 1, 2, 5 to 9, 17.

one, must have paid a rent of five per cent. on the capital expended, and not to favour the work, five per cent. may be added to cover wear and tear, chance of disuse, and to produce a profit; together, an annual rent of 30,000*l.*, at 300 working days in the year, 100*l.* per day. The extra depth given to the basin and docks was such as enabled ships of the line, with all their stores on board, to be taken into them at any time, neap as well as spring tides, instead of being necessarily, as theretofore, dismantled before they could be brought into dock at all, and then only at spring tides. The business for which the basin and docks were wanted, was the receiving ships coming in from sea for slight repairs, for the examination of the bottom, cleaning and repair of the copper, besides other small repairs to the bottom; businesses very frequently requiring not more than two or three days, sometimes only a few hours. Before the construction of these docks, the preparatory work of dismantling a ship, taking out her stores and guns, and the replacing the whole afterwards in a state fit for service, might well employ eight or ten days, which, with the chance of as many more in waiting for spring tides for coming in or going out, might altogether occasion a detention of the ship for twenty days, for doing the work of two. The interest on the capital sunk on a ship of the line, with the daily proportion of that capital *used out*, if it may be so called, as the ship advances in age, may be called 40*l.* per day, and the cost of the crew 90*l.*,

so that 130*l.* per day may be estimated as the daily expense ; and the amount of demurrage, for eighteen days, would therefore have been no less than 2,340*l.* By means of the new docks, a ship of the line not only might, but actually did, come in from sea and go into dock with *all in* on the same day, and go out to her station at sea the next, the little work to be done to her bottom being finished. Supposing such a demurrage to have been saved but ten times in a year in each of these docks, the cost of the whole work would have been repaid in between six and seven years—or would have been earning beyond a rent of 30,000*l.* a year, a clear profit of 16,800*l.* a year ; not including the other uses derived from the basin and jetties, such as might enable, and in the year 1799 actually did enable, “ four ships to be “ fitting in the basin at once, and three fitting at the jetties, “ the difference, in point of dispatch, being half the time “ required for fitting them at moorings, and the cost of “ workmanship at least a third less.” And to this pecuniary saving and profit, must be added the incalculable advantages which, in time of war, may be obtained by dispatch in the execution of repairs and fittings of this nature.*

Accounts, such as those in question, shewing the rent paid for accommodation, and the need of putting it to the fullest use to repay that rent, would lead to many unexpected reductions. A dock, for instance, would never be

* Naval Papers, No. 2, page 42 ; No. 3, page 117.

left empty while any use for it could be found, and the same ship would not be left in the same dock for five or six years for want of hands, whilst new slips and new docks were building elsewhere. A further saving of rent and of demurrage would be seen to be attainable, by putting as many hands at a time to the work carrying on as could be advantageously employed upon it, so as to complete the whole in the shortest time. It would also indicate the loss incurred by limiting the working-time whilst day-light lasted, to the usual working hours. It would suggest the prolonging in summer the working-time, by means of a double set of hands, so as to make use of all the day-light, or even the rendering the work incessant, by the aid of artificial light. Such an improvement once admitted of, it would then be perceived that our existing arsenals are adequate, in extent of accommodation, to the performance of double the quantity of work that has ever been done in them, even in time of war; thus producing the same effect as if they were all at once, as if by magic, doubled—and that now, in time of peace, any expense incurred for the farther extension of our existing naval arsenals, is, in fact, so much money thrown away.*

* See Naval Papers, No. 5, pages 11, 13; No. 6, pages 27 to 47.

BOOK-KEEPING.

It appears from what you say on the subject of book-keeping, as also from what I have collected from other recent publications, that all are agreed as to the need of keeping accounts more correctly than heretofore; and that the mode of book-keeping has become, in regard to the several public establishments, a question exciting very general interest, although much difference of opinion, with some appearance even of hostility, in discussion, has been entertained as to the mode to be preferred,—without the difference between one and the other mode having ever been clearly shewn, or even perceived. I am not an accountant by profession; I can have no predilection for Italian, English, or any other mode of book-keeping, farther than as the one, more than the other, may be shewn to afford the information required with the greatest clearness, and at the least expense of time and money. Clearness in the accounts relative to public expenditure, seems the more necessary, as in order that the public may derive full benefit from them, it is essential that they should be intelligible and instructive, to a number of persons who are not expected to have acquired any accountant knowledge beyond that in use for their domestic concerns, but who

nevertheless are necessarily entrusted with the management of these securities against inefficient expenditure; and, for these reasons, I cannot but prefer that mode of book-keeping which has the fewest technicalities, if it be as good in other respects.

In regard to the Italian mode of book-keeping, which you seem so decidedly to prefer, although not explained in your work, being desirous of satisfying myself that I had not mistaken its peculiarities, I have taken various means of enquiry, and have referred to several books on the subject; but on the present occasion, I shall select for reference the Encyclopedia Britannica, as being a popular work likely to be in many hands.

On reference to the article, "Book-keeping," I find that the distinguishing property of this mode is, that it is carried on by what is denominated *double entry*. To render clear what I have to say on this subject to persons not accountants, I may be excused making a few extracts from that work, showing the nature of this mode of book-keeping.

The Italian method will be found to require "three principal books." 1st. A book denominated the "Waste Book, or the Day-book," 2nd. "the Journal," and 3rdly, "the Ledger." The waste-book or day-book, (which latter name appearing to me the most appropriate term, I shall continue to use; waste-book being at the same time the most inappropriate for a book to be preserved as evi-

dence) “contains an exact register of all occurrences in business, in the same order as they take place.” The journal, (like the day-book) is a fair record of all the transactions, but taken from the day-book, and entered “in the same order as they stand there, but expressed in a *technical style*.” In the ledger, the *arrangement* is different, “articles of the same kind are collected together, and for that purpose it is divided into many accounts, under which the different branches of business are arranged. Each account is introduced by a proper title, to explain the nature of the articles it contains;” and “on the opposite pages of the same sheet are placed, money received on the one side, and money paid on the other; or goods bought or received on the one side, and goods sold (or otherwise disposed of) on the other.”

Thus it appears, that the Italian mode of book-keeping has acquired its appropriate term of *double entry*, because according to it, *two entries* of the *same facts*, in the *same order*, are made in *two books*, one called the day-book, the other the journal; in the one, the day-book, the entry is made in terms of ordinary language, being such as are the easiest set down and understood; but in the other book, the journal, the same facts are again entered in the same order, but translated into a technical language, well known to be wholly unintelligible to many, and little understood by any but the few who make it the object of their special study—a language the more objectionable, as the terms employed

being in common use for expressing other ideas, require, on this occasion, their signification to be changed, before they can be made to render the facts intelligible.

It has been supposed by many, that the system of double entry did not depend on the peculiarity I have described, but on the arrangement of items from the day-book in another book, the ledger, putting all sums and articles received on one side of the book, and all those expended on the other side; but this arrangement will be found equally to take place in the ledger, when books are kept by *single* entry.

To give a better idea of the difference between the two languages used, here follow examples taken from the *Encyclopedia Britannica*, in exemplification of double entry.

According to the terms used in the day-book, an entry appears in it, "Paid John Bell, in full, 52*l*." A record of the transaction which, it appears to me, is expressed in as few words as possible, and in the most familiar terms; intelligible, I will venture to say, to every boy who might be employed to record the transaction, and equally so to every one who might afterwards have occasion to look to it for information.

The same transaction is entered in the journal, thus translated, "John Bell, Dr to Cash, paid him in full, 52*l*." Here are, in the first place, nine words employed to express what was in the day-book expressed in five—2nd, A fictiti-

ous personage is created, under the name of Cash ; a fiction which the uninitiated in the mysteries of double entry would not deem essential to perspicuity ; and after having enlisted this fictitious personage into the service, it would not easily be comprehended by the uninitiated whether Bell had paid the sum to Cash, or whether Cash had paid it to Bell. Such a book as this journal, I therefore look upon as worse than useless ; in many important lights, as mischievous ;—mischievous on account of the extra time employed in writing such a journal ; much more mischievous on account of the need required by it of engaging clerks possessing peculiar talents, instead of the ordinary ones of reading, writing, and casting accounts correctly, which extraordinary talents must be much more highly paid for ;—and still more mischievous, by reason of its unaptness for the object of accounts, that of affording intelligible information. What originally could have induced mercantile men to give themselves this extra trouble of learning and making themselves familiar with this mode of book-keeping, and of writing every transaction in the journal, does not appear ; but what presents itself as the most natural and probable is, that of a wish for concealment of their transactions, a material object in private mercantile transactions ; but in regard to public concerns, no such motive seems justifiable ; and great mischiefs must necessarily be the result, if the technicality and source of obscurity introduced in the journal by the Italian mode, were

transferred throughout into all the accounts in which officers, ministers, and Parliament are to refer, for whatever information they may require relative to the management of public concerns.

There is, however, one defect in accounts as kept by single entry, although it be not inherent in the principle itself; namely, that entries of all kinds are usually made in one ledger, at most under two heads; the one called the personal account, containing all accounts with persons, goods, and money—the other, the cash account, containing no transactions but such as relate to cash. Thus no separate account is kept as to any particular article of profit and loss, or of receipt and disposal. The ledger, on the principle of single entry, is, however, quite as susceptible of arrangement; by which articles of the same kind are collected together, and balances of them struck, as is the ledger where accounts are kept by double entry. By a column of reference, as used by Messrs. Brookman and Beltz, reference may be made backwards and forwards from the day-book to the ledger, and vice-versa, the same as where a double entry had been made by previously transferring the items from the day-book to the journal.

It is this more perfect ledger that I have in view when speaking of single entry, and I conceive it to be divided into as many books, and under as many heads, as the nature of the transactions to be kept account of, may for their elucidation require; as also that the entries be made in it

by a book-keeper, not the same as that one who made the entries in the day-books, so as that every item of account being entered by two different persons in two different books, a great advantage is obtained in point of correctness.

To me it appears, that according to the description given above, and the same whether by double or single entry, the day-book and the ledger are the two forms of books requisite, and the only two, into however many different heads the ledger may be divided, or however many copies of them may be required for use in different places.

The day-book being that in which facts are recorded as they arise, in language the most simple, and without any need of thought or abstraction of mind with a view to ulterior classification, is the least subject to error; and the writing it is an operation that can be performed by any man or boy of ordinary understanding, who can hear well, read what is before him, copy exactly, and write a fair hand. The purpose of the ledger, as appears from the above description, is the classing and exhibiting the facts already recorded, under such heads as shall exhibit transactions of a similar kind, in a similar form, either as regarding money or money's worth. The facts or transactions are arranged in it under two leading divisions, one exhibiting the receipt of property, the other the disposal of it. In these two books, or sets of books, every thing therefore is to be found that is required in accounts; recordation in the day-books, classification in the ledger.

For the same reason that it appears to me better that the technical terms in the instances above adduced should be avoided, so should all other technical terms, whenever terms in common use for the same idea can be employed. Instead of *debtor* and *creditor*, the terms that present themselves as being in common use, and as being better suited to public accounts, which have for their subjects goods as well as money, are the terms *received* and *disposed of*; more particularly as the manner of disposal of articles in public concerns is often for a return of value but ideal.

All such entries as "Sundries debtor to Paper" would thus be done away with, as producing obscurity; although the term sundries, being a common and comprehensive term, might perhaps be sometimes employed in making abstracts to save the trouble of enumerating small items. And as to services, the simple facts of what service, by whom performed, at what time begun, when completed, at what rate and when paid for; so as to the matériel, of what nature, at what price, when received, what quantity, from whom, when paid for, how disposed of, would be intelligible to all, and ready for any use requisite to be made of accounts.

In a large establishment, where the transactions are extensive, some division might with advantage be made in the accounts, even from the first entries in the day-books. Of this description are, for example, in a naval arsenal, such articles as timber, iron, copper, or the wages or salaries of the personnel; each of which items might have its separate

day-book ; and so much the more conveniently, as one or two of these items would usually furnish ample employment for a clerk. So in that branch of the accountant-office, where cash payments might be made, there might possibly be a day-book for ready money payments, another for bills drawn at future dates, and another for sums advanced on account. Every day-book should have a column for references to the ledger, into which the several items would afterwards be posted, as that ledger would again have columns for reference to the day-book.

The not balancing accounts with sufficient frequency appears to me to be a defect in book-keeping common to almost all methods, and to the very general practice ; and it would seem that the more complicated the accounts, the less frequently are balances struck, although in such cases frequency is most required. This defect may probably have originated in the uninterrupted use made of the day-books, so as not to leave time to the clerk who keeps it to make entries from it in the ledger, nor to admit of its being put into the hands of another to perform this operation, until the day-book was filled up, and a new one taken. It appears to me that this difficulty might be obviated, either by having separate clerks to post the books daily, after the transactions of the day were over, or before those of the succeeding day began—or by keeping two distinct day-books for alternate days, weeks, or months, as the case might require. Thus the books for Mondays, Wednes-

days and Fridays, for instance, would be at liberty for being posted on the Tuesdays, Thursdays and Saturdays, and the day-books used on those days might be posted out on the three others. The same object might be effected by the adoption of the practice sometimes resorted to of making the original entries on loose sheets, afterwards pasted, or otherwise attached together in a book; but this mode appears highly objectionable, not only on account of the real danger of loss of the loose document, or substitution of a false one, but also as leaving constantly room for suspicion of falsification—in the one case injurious to the public, in the other case to individuals.

The accuracy of the most abstracted accounts, as for instance, those which are laid before Parliament, must depend on the correctness of every item in all the accounts from which they are taken, in every degree, down to the last minutiae that are taken account of. It is with these minutiae then that the reform of books should begin, rising step by step to more condensed and more abstracted books, until ending, instead of beginning, with those laid before the superior authority. Whenever such a mode of reform is systematically began upon, the facility of making it, and the perspicuity attendant on it, will, I will venture to assert, become so evident as to do away that contrariety of opinion which now exists in regard to this or that method of book-keeping. It will be found, that many existing forms are not ill suited to their purpose, such as

some in the Ordnance accounts, as given in the appendix to your second report, and a few of those in the naval department, some are capable of being employed, although many of them are altogether useless.

The general idea that simplicity and perspicuity in recordation and abstraction are the objects to be aimed at in book-keeping, should be constantly pursued in the case of every account. In each case, when it is to be considered how far the account answers the purposes intended, or what reform is needed in the mode in which it is kept, the first questions to be put are, what is the object of that particular account? What are the results it is intended to exhibit? The answers to these questions will readily point out under what heads, and in what particular form, the items should be entered, so as to exhibit those results in the simplest and most intelligible manner.*

* The subject of book-keeping in general, with reference to public accounts, is treated in great detail by my brother, Mr Jeremy Bentham, in his Constitutional Code, chap. ix., sec. 7, Statistic Function, (v. 1, p. 274) just now published. This section contains in particular, a most comprehensive view of the several items necessary to be taken into account in regard to every department of public business.

GOVERNMENT MANUFACTURES.

It has already been observed, that in the instance of the naval department at least, the expenditure for providing the matériel may be considered as at least equal to that for engaging the services of the personnel; it becomes therefore of the first importance to consider the most economical means of providing the necessary matériel, and with that view to investigate a question which seems to have been much agitated in your committee,—whether the several articles of the matériel in general, or at least the greater part of them, should be provided as raw material, and be manufactured into the state complete for use on government account, under the inspection of officers in the public service, or whether those articles should be obtained by contract or purchase, in a manufactured state, ready for use.

The practice of manufacturing on government account, you admit, is attempted to be defended on the ground that articles are provided in this way cheaper and better than they could be provided by contract; but you proceed to affirm “that such a defence rests on what is *morally impossible*.” It has on the contrary been an opinion which I have long since entertained, and brought forward, and which after repeated investigation and consideration of the subject, I am induced again to affirm, that most articles used

by Government may be manufactured on Government account, at an expense much less than that at which they can be obtained from private manufacturers; and that all the articles most essential to the success of our naval and military establishments, so manufactured, may be rendered much more trustworthy and suitable for their intended purposes than they are likely to be if procured by contract. It can be proved, that a variety of articles have been manufactured in his Majesty's naval arsenals, both cheaper and better than similar articles provided about the same time by contract; and I feel no doubt that, by extending this practice to a variety of other articles, an annual saving may be made in public expenditure far greater in amount than has ever been held up to view as practicable, by any proposed reduction either in the personnel employed in the civil departments, or even by any other reduction admitted to be attainable, in regard to the expenditure, for any civil purpose in the navy.

The statements on which you ground your assertion of the advantages of obtaining articles ready manufactured, are, that "private manufacturers can buy materials cheaper, and
 "take better care of them; they can get labour cheaper,
 "make it go farther, and superintend it better, and at a less
 "expense than any public office. The success of any public
 "office in manufacturing depends on what it is impossible to
 "accomplish, namely, to find numbers of officers willing to
 "work with the same zeal and integrity for the public that

“ they would work for themselves—that the slightest deficiency in skill, activity and integrity, on the part of the public officers, in performing the several operations, from their going to market to buy a stock of raw materials, to the storing of the goods to be made with them, will be taken advantage of by numbers of persons in numberless ways.” You then repeat that, in regard to materials, they will be bought in too dear, will be wasted in working them up, and will be liable to be stolen or damaged.” Then again you proceed to affirm, in regard to manufactured articles, that such of them as are manufactured on Government account “ will be more exposed to be wasted and stolen than if purchased by contract, from the difficulty of keeping equally exact accounts of the quantity received and delivered;” and, in confirmation of these assertions, you add, “ although the victualling and other offices that carry on manufactures produce accounts, by way of shewing that they make them cheaper than they can be got by contract, this does nothing towards supporting their case, because their accounts are all kept in so imperfect a manner that they cannot be relied on.”

First, in regard to the purchase of articles in the state of materials, I have to observe, that the officer trusted to for the purchase on Government account, who may be called a public purveyor, has the same means of enabling him to judge of the true value of materials that a private manufacturer has. There is published in London, at least, a

weekly price current of almost all the materials that could be required; doubtless there are other means equally instructive as to the price of most articles in other great commercial towns, and in regard to some articles, such as copper, prices are periodically printed, which although expressly for the use of private manufacturers, would be equally obtainable by the public purveyor; besides which, I always found it easy to obtain all the requisite information relating to the value of materials from a number of liberal and commercial men; and even private manufacturers, when once the principle of manufacturing on Government account were generally adopted, would be the more disposed to furnish information and advice when called for, as they should feel assured that they could entertain no hopes of furnishing the article in a manufactured state. It must also be remembered, that the articles must be purchased in some state; and if the purveyor be liable to be deceived, better that he should be so on the raw material than on the article in its much more costly manufactured state.

Secondly.—Articles in the state of materials being in more general use, and more in quantity, there would also be a far more extensive competition for their supply, than in the case of the same articles in the manufactured state.

Thirdly.—One and the same material is generally applicable to a variety of purposes, so that if after having

laid in a stock, any change in the demand should render a material no longer wanted for the purpose for which it was provided, it may be employed for some other purpose; whereas an article brought to the manufactured state is usually required only for one purpose, and any change of circumstances may occasion a great store to be kept uselessly on hand, or sold at a great loss.

Fourthly.—In regard to the more important consideration of quality, the fitness of an article for service, in as far as regards the material, is much more easily examined into, and submitted to certain tests of goodness by which its quality can be judged of, whilst in the state of a raw material, than in its manufactured state.

Fifthly.—Should any extraordinary monopoly or other circumstances enhance the price of a material unreasonably in our markets, Government can occasionally have recourse to a supply from foreign countries, free from many restraints which might shut up from an individual such source of supply;* an expedient which might be found much more difficult and obnoxious, and in general much more objectionable, in the case of a manufactured article.

* This expedient was had recourse to in the year 1806, when by this means, and that of having a stock of copper on hand at Portsmouth, there is every reason to believe the then existing monopolising price was put a stop to; and the consequent saving to Government, in the article of the material of copper in sheathing alone, amounted to 38,000*l.* per annum.—See Naval Papers, No. 2, page 71 and note.

It is true that the present mode in which purchases are made by contract are in many respects ill suited to the obtainment of any article at a just price. For these thirty years past I have, on various occasions, called the attention of the superior authority to these defects, and suggested such measures as appeared applicable to the obviating them. I have proposed for example: First,—A mode of advertising for contracts, and receiving tenders, less repugnant to competition than the present one. Secondly,—Simplicity in the mode of expressing the price of articles, instead of the present additions and subtractions of percentages on former prices, and other complications, which render the real price offered or paid scarcely intelligible to many who are thus deterred from becoming competitors. The obscurity as to the real sum contracted for is further increased by delays in making out bills, by payment by bills at a future period instead of ready money, by fees of office, and other circumstances, which can only be fairly taken into account by the few who are long accustomed to this mode of contracting. Thirdly,—Taking off all unnecessary restraints on contractors, which, without insuring either quality or timeliness of delivery, require to be compensated by an increase of price. Fourthly,—Requiring the fixing the delivery of the articles at such a period as may enable contractors, who have not the advantage of previous intimation, to enter into competition for the supply. Fifthly,—The fixing the time of delivery of certain

portions of the whole quantity by certain days, instead of, as under the present system of contracting for the delivery of the whole by a certain day, by which the contractor, when the article happens to be at a low price, loads the public with an anticipated supply, for which he obtains immediate payment, thus entailing a considerable loss in useless interest; and on the contrary, when the articles are dear, delays the supply, so as either to cause works to be retarded for want of the requisite materials, or to make it necessary to substitute less appropriate materials. Sixthly,—The not contracting at prices at which the article evidently cannot possibly be supplied; for the consequence of this practice is a need for allowing a subsequent advance upon the contract price, which is often so great as to far exceed the value of the article.

The defects which I thus proposed to obviate, may well be expected to cause Government to pay so much higher a price for raw materials than private manufacturers, as by that circumstance alone to make a great difference in the ultimate cost price of the articles manufactured out of them. But the remedies are easy, whenever real individual responsibility shall be introduced. Besides which, it must be considered, that so long as these defects exist, they do not act with less force in enhancing the price at which Government procures the manufactured articles in a finished state, than they do in the instance of the raw materials—on the contrary, as the articles, in a manufactured state, are in the

hands of comparatively few persons, as they cost more than the materials required for their manufacture, and as their quality is far more difficult to ascertain, the loss in their instance is proportionally increased.

Sixthly, As to your assertion, that private manufacturers can get labour cheaper, make it go farther, and superintend it better, than any public office. If by public office you allude to an aggregate of persons, few of whom have any pretensions to the necessary scientific or practical knowledge, such as a Board, a Committee, or an aggregate of Dock Yard Officers, left to settle amongst themselves what part each should take in seeing to the execution of the orders given; and if this be brought into comparison with the management of a private manufacturer, which management is always on the principle of individual responsibility, in this case the assertion, that private manufacturers might get labour cheaper, make it go further, and superintend it better, might perhaps be supported. Yet even with these drawbacks to good management, it will be found, on investigation, that, in many instances, the price paid in several establishments for naval or land service, whether paid in the form of wages, or even in that of piece-work, has actually been less, and I believe I may add, in many cases, even much less, than is paid by private manufacturers.*

* As for instance, at a time when shipwrights in a Royal Dock Yard, working from five o'clock in the morning till seven in the evening, received a real pay, inclusive of the extra pay of nominal double days

That the work done may be better done, is fully proved by the acknowledged superiority of ships of war built in a Royal Yard, compared to those built by contract.

In regard to a manufacturer's being better able to keep any articles in store than Government; I can see no grounds on which this assertion can have been made. The keeping of a material in its simple state, seems more easy than the preservation of such manufactured articles, at least, as are composed of different materials, especially if acting chemically one upon the other; the circumstances on which the preservation of any material depends are easily known, and as easily reducible to rule; the extent and variety of the accommodations already provided in Naval Arsenals, affords a choice of suitable storehouse room for materials of almost every description, much greater than any private manufacturer can be expected to provide: and the precautions which may be taken in a Government Arsenal against speculation, embezzlement, and theft, or by conflagration, considering the unlimited number of persons under military discipline at command as guards, and the responsibility which storekeepers might be subjected to, renders it difficult to conceive that private manufacturers should have any superiority in this respect.

and extra tides, of 5*s.* 5*d.* per day—(Naval Papers, No. 3, page 107.) Shipwrights of the River Thames, and at the same time out of employ, refused to engage themselves for less than 12*s.* per day. (Naval Papers, No. 2, page 21.)

As a striking proof of the practicability of effecting a very great reduction in public expenditure, by means of manufacturing on Government account according to an improved system, I shall refer to the three establishments of which I accomplished the introduction under every discouragement, arising from apprehensions of mischief, and a general aversion, on the part of subordinate officers, to the introduction of machinery; and in spite of every obstacle I met with from the ordinary routine of Dock Yard business, and still more, from the constant endeavours exerted, publicly and privately, from first to last, by individuals deeply interested in preventing their introduction, and in putting a stop to them when once completed. If the investigations already gone into, by order of the Admiralty and otherwise, have not furnished convincing proofs of the economy, and other specified advantages, resulting from these establishments,* I now challenge further inquiries into the minutest particulars respecting them. I do so, not only for my own credit sake, but for the far higher consideration of the saving of 10, 20, 50 per cent. or more, according to the article, which might thus be made on the expenditure of most of the manufactured articles now procured by contract.

These three establishments were the wood-mills, metal-

* Naval Papers, No. 2, p. 69 to 103, and No. 8, p. 173 to 175.

† Naval Papers, No. 1, pp. 13, 18, 237; No. 2, p. 68; No. 8, pp. 166, 131, &c.

mills, and millwrights' shop in Portsmouth dock yard. The wood-mills, including the block machinery, were instituted with a view to working wood for a great variety of purposes by machinery,* the metal-mills generally for the working metals, and the millwrights' shop for all works comprehended in the business of the engine-maker and millwright.† The management of these three establishments was by the then Lords of the Admiralty confided to me, without any controul as to the number of persons to be employed, or the rate of payment of them; but under that individual responsibility which characterized the office which I held, and under the constant check afforded by the constant inspection of the dock yard officers and the Commissioner on the spot. The manner in which this service was executed is detailed in my Naval Papers, No. 8.—for the present purpose it is sufficient to state, that each establishment was managed by a master workman, at the wages of no more than 4*l.* per week, and a foreman, at the wages of from 1*l.* 16*s.* to 2*l.* 2*s.* per week, without any thing additional either in the way of house or house rent, or other allowance or perquisite of any kind, or by any *engagement* for retaining them after they should become incompetent, or for their final superannuation. The operatives in these establishments were of several descriptions and denominations; in the wood-mills of nine denominations; in the metal-mills of eight; and of three in the millwrights' shop; and those

* Naval Papers, No. 8, page 191.

† Naval Papers, No. 8, page 144.

of each denomination were again divided into two or three classes, at as many different rates of pay; the pay earned, varied from 9*d.* to 10*s.* a day. The *average* day pay, however, being in the metal-mills, including the master, 3*s.* 11 $\frac{1}{4}$ *d.* per day, in the wood-mills, 2*s.* 10*d.*, master also included—rates of pay which, considering that it was then the dearest time of war, will not probably be thought higher than would have been paid by private manufacturers for the same sort of work. In the millwrights' shop, the average pay to millwrights was at first but 4*s.* 1 $\frac{1}{4}$ *d.* per day, that of the foremen, or first class, being 7*s.* per day, and men of the second class 5*s.*, while labourers and boys were paid at different rates, down to 9*d.* per day. At the same time (in the year 1805,) the ordinary pay by master-millwrights, in the service of private individuals, to all their workmen, not including foremen, was 6*s.*, besides extra work at an encreased rate, and exclusive of the master's profit of 1*s.* 4*d.* per day for every man employed, and always charged whenever the master-workman was not himself at the head of the concern—a profit entirely saved in the case of the millwright's shop in question.

In these three establishments there was no clerk; the accounts were kept by the masters of each, assisted by a cabin-keeper; who in the case of the wood mills, at a time at which I happen to have preserved the note, was a lad at 1*s.* 2*d.* per day. The accounts of wages were sent up to me weekly, for my own inspection as to their propriety, and

for examination in my office as to their accuracy, and for the calculations. The men were called over by the master of the mills, for which business five minutes only were allowed; they were paid by the master weekly after the working hours were over.

As to the actual savings to Government by the introduction of these establishments, the accounts of the metal-mills, which were in the year 1812 made up to the end of the year 1811, and submitted to the Admiralty Board, for the purpose of exhibiting these savings, shewed that the total outgoings to that time, including the original outlay on the erection of the mills, with interest and compound interest at five per cent., with an additional per-centage to cover wear and tear, and risk of disuse, had amounted to 892,528*l.* 13*s.* 10*d.* The returns and value of the stock upon the premises had amounted to 960,743*l.* 18*s.* 4*d.*, and the whole of the capital borrowed having shortly after been paid off by profits, the establishment was, in 1812, working at a clear annual profit of 40,954*l.*

In the wood mills the annual savings amounted upon blocks and blockmaker's wares, including those not made by machinery, to 16,621*l.* 8*s.* 10*d.* per annum; besides savings on a variety of other articles, in some to the amount of between 60 and 70 per cent. on the usual expense of workmanship.* In regard to the millwright's shop, no abstract had been completed before my office was

* Naval Papers, No. 8, page 165, article, Shot Racks.

abolished; and not having now access to the accounts, I cannot state, with any precision, the amount of the savings effected by its means. It may, however, be generally estimated at not less than 5,000*l.*, and may well have been 10,000*l.* or more per annum.

In regard to other items of manufactures which I had prepared notices of, for the purpose of exhibiting to your Committee the cost of fabrication in a dock yard, compared to contract prices, I selected those of which I considered the accounts as being the most to be depended on. The first of these items was the building a ship, the details of which may be found in the papers ordered to be printed by the House of Commons, 1806. In this case the workmen's wages in the dock yard were reckoned at the prices paid by the piece, and the timber was estimated under the regulations which had then lately been introduced for ascertaining its exact value, and were then in their fullest force; and having myself made additions for items of expense not included in that account, such as for rent, insurance, interest of money, salaries, it appears that the savings obtained by building rather than contracting, amounted, on a 74 gun-ship, to 17,070*l.* 7*s.* 11*d.*

In the instance of mast-making, when I first contrived the cocques, now in general use, and was desirous of ascertaining the saving effected by them, I had opportunities of knowing that the cost of making masts in a dock yard was well ascertained. It appears by papers, published by the

House of Commons also in 1806, that the price allowed a contractor for making in parts, the main-mast of a 74-gun ship, was 124*l.* 12*s.*, the cost in a dock yard only 59*l.* 14*s.* 1*d.**

So in regard to the making of cordage and sail-cloth, the minute investigations entered into on these branches of business enable me to affirm that the data are correct, from which it appeared that a saving of from 86,000*l.* per annum to 159,000*l.* might have been made, by manufacturing cordage on Government account, instead of obtaining it by contract, and of perhaps 200,000*l.* by sail cloth.†

In regard to victualling stores, the investigations I had occasion to enter into, relative to portable soup and biscuit-baking, pointed out that the soup, although not near so advantageously manufactured as it might have been, was still obtained at a cheaper rate than that at which it could be procured by contract. In regard to biscuit, its cost was about the same as the contract price; but this was a manufacture that admitted of great improvement in the manipulation, and in the consumption of fuel; indeed it appeared, from general estimation, that about half the expense of labour might have been saved by appropriate machinery, and half the expense of fuel, by a change of the kind of

* See United Service Journal, Feb. 1830, page 199, where various other particulars appear in regard to this question.

† See Naval Papers, No. 2, and United Service Journal, February, 1830.

oven employed, for one appropriate to the burning of coals instead of wood.

3. That the success depends on finding numbers of officers willing to serve with zeal and integrity.

To this the answer is, that manufacturers have no difficulty in finding a sufficient number of persons willing to work with zeal and integrity in their private concerns; that Government pay is as sure as theirs; and that Government employ is considered more desirable. And although the principals in private manufactories often give that general superintendence which it might easily be made the interest of the superior local operative officer to afford, still the actual superintendence of workmen, in I may say all the great manufactories I have visited, is executed by managers and foremen, at rates of pay of two or three pounds a week, and often of much more.

4. That materials will be wasted in working up.

On this particular the means of efficient check are easy. When once the quantity of materials requisite to produce a given quantity of the manufactured article is ascertained; accounts periodically balanced, shewing the quantities of raw material delivered out to the manufacturer, and those of the manufactured article received back into store, would at once point out whether there had been any loss by waste or theft in the course of manufacture; and if the receiving officers did their duty, as well in regard to those manufactories as in regard to contractors, and as has been uniformly

the case in regard to the three above mentioned establishments at Portsmouth, no damaged or imperfect articles would be received into the store.

In the storekeeper's department there seems no greater difficulty in duly keeping accounts of quantities received and delivered, if manufactured on the spot, than if procured by contract. On the contrary, if there be a difference, it is in favour of the articles having been manufactured on the spot; certain and convenient times can in this case be fixed on for receipts, whereas in regard to articles furnished by contractors, receipt must be dependant on wind and weather and various accidents, so as frequently to embarrass the storekeeper and receiving officers, by the immense quantity of articles brought at one time.

As to your objections grounded on the imperfections of accounts, I am not sufficiently acquainted with those of the Victualling Department, to enter into the deficiencies that there are or have been in the accounts of articles manufactured by them. But that accounts may be as accurately kept in Government manufactories as in a private concern, is again proved in the three establishments already referred to. In the accounts of the metal-mills, for instance, not only was a balance struck half-yearly, of the out-goings with the in-comings, including interest and compound interest, at five per cent. on the money considered as borrowed for the erection of the mills, and for all other expenses incurred in or for them, and the work

done in them from the first; but farther, an additional percentage was regularly charged on the buildings and machinery, which I have always thought it proper to charge on permanent works, to cover wear and tear, and insurance against risk of disuse.

That these accounts were unquestionable, may be presumed from the circumstance of their having been, as I understood, transmitted for examination to a gentleman professing himself, when he asked for them, as "largely concerned in the copper trade," who, on account of the "injury done to the interests of private manufacturers by these establishments," was professedly endeavouring to tain the abolition of manufacturing copper on Government account; and as I never heard that, after looking into the accounts, he thought it necessary to make any farther enquiries into the business, it is not without reason I infer, that there were not any defects which the scrutiny even of so interested a person could detect.

As to the accounts of the millwrights' shop, I had not completed the abstracted statement I was preparing, with a view to exhibit the savings that had resulted from this establishment, when my office was abolished; and not having afterwards had access to these accounts, I have now no means of stating in detail the items of which they were composed. However, the copy I happen to possess of

some accounts of engines and machinery, shews that they entered into all the details of the quantities of materials used for each repair, down to a pound of iron even, and to an hour's time of each particular man employed for every distinguishable portion of each particular work.

The account of the works carried on in the wood-mills not having, to my knowledge, fallen under so able a scrutinizer as those of the metal-mills, it may not be unsatisfactory to enumerate here the heads under which outgoings and returns were, in that instance, exhibited to the Navy Board.

These heads were as follows :—

“ OUTGOINGS.

- “ 1. Account of outstanding capital, carried on from half year to half year, as it was expended.
- “ 2. Interest on ditto, at five per cent. per annum.
- “ 3. Estimated expense, at the rate of hazardous insurance, from loss by fire.
- “ 4. Capital sunk in buildings and machinery.
- “ 5. Extra per-centage, at the rate of five per cent. per annum, on this particular capital, as requisite in form of rent beyond interest on the money sunk.
- “ 6. Estimated expense in the way of rent, during the first three years and a half, for the occasional use of the steam-engine, employed principally for pumping the docks.

- “ 7. Current expense of keeping the steam-engine at work, including engine-keepers’ wages.
- “ 8. Cost of various small articles of tools, &c.
- “ 9. Salary to the master of the wood-mills.
- “ 10. Estimated expense, namely, at the rate of 25*l.* per annum, for this concern, of calculating and preparing in my office, by my first clerk, the weekly accounts such as of wages due to the several persons employed in these mills.
- “ 11. Estimated expense of advertising (by the Navy Board) for materials, &c.
- “ 12. Wages to wood-millers, blacksmiths, labourers, &c.
- “ 13. Materials and other articles received from the dock-yard stores, including an extra sum put upon their cost price to pay the dock-yard expenses, &c. on receipt and subsequent delivery to the mills.
- “ 14. Estimated expense of sending blocks and block-makers wares to other dock-yards.”

“ PER CONTRA RETURNS.

- “ 1. Value of articles manufactured in these mills, and delivered into store at Portsmouth dock-yard, reckoned at the prices then paid to contractors, as influenced by the proportions received from different ones, who were respectively paid for the same articles at a higher and a lower rate.
- “ 2. Ditto of the customary extra workmanship on ditto.

“ 3. Ditto of offal sold or returned into store.”

“ 4. Ditto of stock in hand.”

Another reason, from which you conclude that “ it is
 “ utterly impossible that public offices can themselves
 “ manufacture any article at as low a price as it can be got
 “ for by a contract,” is that “ contract prices are always
 “ kept as low as a combination of manufacturing skill, per-
 “ fect economy, and a very low ordinary rate of profit will
 “ keep them.” A number of instances have, however,
 come to my knowledge, where manufacturers have found
 means of obtaining their contracts at prices very much
 higher, even more than double what they themselves con-
 sidered as affording them a fair profit. In regard to copper,
 for example, previous to the establishment of the metal-
 mills, Messrs Grenfell and Williams obtained from $4\frac{1}{2}d.$ to
 $6\frac{1}{2}d.$ per lb. for the re-manufacture of old copper, but as
 soon as it was proposed to perform this operation on
 Government account, they offered to re-manufacture the
 whole at $2\frac{1}{2}d.$ In the instance of Roman cement, before
 the establishment of the cement-mills at Sheerness, the
 contract price was 5s. per bushel; as soon as those mills
 were ordered, the contractor reduced his price to 3s. 6d. per
 bushel. One of the last subjects I had occasion to investi-
 gate, before the abolition of my office, was the exorbitant
 profit which had been obtained under pretext of an im-
 provement in ships’ fire-hearths. The extra profit received
 by this contractor on all the fire-hearths supplied to the

Navy, was from fifteen to thirty-five per cent. above what he considered as a fair profit, as shewn by the reduced price at which he was willing to continue the supply.* It is indeed well known how immense have been the incomes derived by private manufacturers from their supplies to Government, often far exceeding the utmost salaries paid for the highest ministerial services.

In regard to the quality of the articles to be provided, you say that that of contract goods may be secured "without the slightest risk of fraud or disappointment, by having proper specifications and deeds of contract, and by enforcing a strict inspection." But long experience has shewn, on the contrary, that manufacturing contractors, in particular, often find means of evading appropriate specifications, especially in regard to articles of great demand at times of extraordinary need. For example, during last war, in the instance of a kind of copper-sheathing called improved, the duration of which was guaranteed by contract to be of a certain number of years, the penalty provided on failure being, that the contractor should replace with new all sheathing that should have proved of shorter duration than the time specified. A considerable proportion of this improved sheathing did decay in a shorter period than the time guaranteed, but on returning the decayed sheets to the contractors, instead of replacing it according to the contract, with new copper, sheet for sheet, they could only be

* See Naval Papers, No. 8, p. 25.

made to give a weight of sheathing equal with the weight of worn copper returned; and this, notwithstanding the strong remonstrances of the dock-yard officers.

An example of imperfections in specifications of contract arising from real, I may say, insurmountable difficulties, may be seen in the existing contract, and in all former contracts for canvas. The goodness as to durability of this article depends on a variety of circumstances not discoverable subsequent to fabrication. The nature of the material, whether entirely hemp or flax, or a mixture of the two—the quality of the raw material as dependant on growth, and on the operation of steeping and separating the fibre from other parts of the plant—the particular process used for bleaching, whether by means of pearl or potash, or by partial or entire substitution of cheaper but destructive articles, such as lime or sulphuric acid—the degree of heat employed for dissolving the mucilage—length of time during which the yarn has been exposed to the air for the purpose of bleaching—the quantity and quality of the starch employed for dressing it—the tightness with which the weft has been drawn, and the number and force of the strokes given in beating it up into close contact with the last crossing of the thread in weaving, &c. Where real difficulties of such a nature as these exist, however much a scientific knowledge of the subject, manufacturing experience, and legal skill, may join to draw up the contract, the impossibility of insuring the conditions of it must be apparent. Re-

course has therefore, at different times, been had to inspectors expressly appointed for providing and receiving canvas; but even under this system unforeseen frauds have occurred, such as deficiency in the usual width. Sometimes weight of the bolt has been evaded or omitted; sometimes trial of the strength of the weft across. In the last "instructions" to the contractor which I have seen, and which are probably in force at this time, the trial of both warp and weft are omitted; an affidavit of the manufacturer is the security resorted to for insuring the performance of the conditions required; and it is provided, that the manufactories are to be open at all times to the Navy Board's inspector, "who will *occasionally* visit" them. But setting aside the difficulty of detecting abuses in these and other such particulars, by an occasional visitation, can it be considered as easier to ensure the probity of an inspector when at a private manufactory, unseen by any one who could be a check upon him, subjected to all the temptations of friendship, flattery, kind treatment, even where pecuniary temptations are of no avail, than it is to secure the probity of a master workman, carrying on the business under the constant inspection of the superior operative officers, as in a dockyard, the Check Officers, and the Commissioner.

In regard to copper-sheathing, on the occasion of its having been represented to the Admiralty that the sheathing on certain ships was bad, and that bad copper had been manufactured in the Portsmouth metal-mills, it was incon-

testibly proved, on the contrary, that the bad sheathing pointed out to their Lordships was not Portsmouth-made, but contractors' sheathing—"That on the examination of
 "the copper on thirty-two ships sheathed with copper, made
 "there, so far from its having been found to decay, as contractors' sheathing had done, sometimes in the course of a
 "few months, frequently in two or three years, the Portsmouth copper had in no one instance been found to decay
 "in so short a period."* Indeed, so convincing were the proofs considered to be by the Navy Board, that they in transmitting, during my absence, the Report to their Lordships, for the first time that they had ever interfered in regard to these establishments, concluded the letter of transmission by saying, "which we hope their Lordships
 "will consider a complete refutation of the alleged defects
 "in the quality of the copper manufactured in Portsmouth dock-yard—[Navy Board to Admiralty, 6th November
 "1812];"—an opinion, in this instance, of considerable value, since blame might have attached to them for having obtained sheathing of inferior quality by contract, however unavoidable, and although greater precaution had been taken in regard to this than almost any other article of store;—whilst on the other hand, neither credit nor advantage could in any way result to them from any superiority of the sheathing produced in the Portsmouth mills. It hap-

* See Naval Papers, No. 2, page 181.

pened also, a few days after that Report was transmitted, that on the occasion of enquiries having been made respecting the persons who had furnished the copper of the Sceptre, which had fouled in a remarkable degree, it appeared that the foul copper on that ship bore the mark of the Mines Royal Company; but that among the strakes were six which bore the marks of the Portsmouth-made copper, and that these six strakes had *not* fouled. I have lately heard it said that private merchants, purchasing old vessels of war, prefer the Portsmouth copper upon them to any other sheathing, in consequence of its superior properties, and I have also heard that it has been found generally on vessels of war of remarkable durability.

In regard to blocks, no examination was ever made of the durability of those manufactured in Portsmouth wood-mills compared to those obtained by contract; but after these mills had been some time established, the remarkable fact appeared, that the total consumption of blocks in the navy had materially diminished.

It is not to be denied, however, that articles have sometimes been obtained as good by contract as by fabricating them on Government account. An example is afforded in the instance of the *Bellerophon*, a seventy-four-gun ship, which was built by contract, and commissioned in the year 1786. She is still lying in ordinary at Portsmouth, after an existence of forty-four years;—up to the year 1799, although always in commission, she had had no work whatever

done to her, but common fittings; she still required no repairs, nor had she, as I have been since informed, had any considerable repair from her first building to the time when, being twenty-nine years old, she conveyed Napoleon out to St Helena, and I understood she was still in service two years ago. But in this instance I have little doubt that the goodness of that ship depended on the uncommon degree of firmness, and steady incorruptibility, of a single Government shipwright officer, of very inferior rank and at low pay. A reference to Naval Papers, No. II, pp. 36 and 37, will exhibit the temptations to a direliction of his duty this officer had to withstand, and may serve as an appropriate and authenticated example, well worth your consultation, to shew how much more difficult it is for public officers to withstand the endeavours of interested contractors, than to do their duty openly in a naval arsenal.

But, on the other hand, may be adduced the example of the *Ajax*, a 74 gun ship, built by contract, and first commissioned in June 1798, which in the same year required shifting of defective works and caulking to the amount of 2,988*l.*, and which having been but five months at sea, underwent repairs which amounted to 25,502*l.*; as also the example of the *Achilles*, also built by contract, which after no more than seventeen months' service, required repairs to the amount of 36,205*l.** These vessels afford sufficiently

* See accounts and papers relating to ships of war, ordered to be printed by the House of Commons, 17th and 21st of April 1806.

convincing and costly examples, in proof that Government cannot even by inspection in the private yard, during the progress of the work, or by examination on the reception of the article, insure themselves against the constant endeavours to evade any conditions which may be required as to the quality of the article to be furnished.

In treating of manufacturing on Government account, the very extensive works of repairs and re-manufactures must not be overlooked. Repairs of frigates by private ship-builders have cost twice as much as the same ship-builders would have required for building new and similar ones, besides that the old materials have been given up to them.* These exorbitant charges had been but recently pointed out to the Admiralty and the Navy Board, when between May 1804, and March 1806, twenty-three vessels of war were given for repair into the hands of private ship-builders. Notwithstanding those representations, on reference to papers ordered by the House of Commons to be printed, the 21st of April 1806, it will be found that four only of the twenty-three cost something less for their repairs than their first cost, the others more and considerably more; although by this document it appears that the repairs were most of them only what are technically called *middling repairs*. The re-manufacturing by contract worn out articles of metals of all kinds would be seen to be no less extravagant, on comparing the low price at which most old articles of

* See Naval Papers, No. 2, page 25, and No. 8, page 106.

this material are sold, with the price paid for new. In regard to metals too, it is peculiarly injudicious to exchange the old for new, since it is a well known fact that they are improved in quality, especially iron, by re-working.

It must further be taken into account, that even supposing manufacturers to take no unfair advantages, and to be contented with ordinary profits; that those ordinary profits are of an amount well worth saving to the public. It is, I have understood, very true, that in some manufactories of great extent, and in regard to which the competition is considerable, cotton-spinning, for example, manufacturers have of late been satisfied to carry on the works at profits of 4 or 5 per cent., where formerly they looked to profits of five or ten times that amount—that some manufacturers, during a short time of general depression, will even go on so long as they can manufacture without loss, in the hopes of future advance of prices; but reckoning only at what might on an average be thought a reasonable profit, 10 per cent.; it will be admitted that a difference of 10 per cent. on all manufactured articles wanted on Government account, is a reduction well worth effecting.

Another objection you make to the manufacturing on Government account, is the great proportion in the number of superintendants to that of operatives in Government establishments. But this disproportion is by no means necessary. By the intended new regulations mentioned in my Naval Papers, No. 3, (pages 132, 133, 138, 140,) a

great number of principal officers, masters of trades, measurers, &c. were to have been abolished, as useless and mischievous. And in each of the three Portsmouth establishments, for instance, a master, a foreman, and a man at labourer's pay as a cabin keeper, were the whole of the non-operatives to about one or more hundred operatives.

A farther and a different reason exists for introducing the manufacture of a variety of articles not now made in a naval arsenal, namely, as affording means by which the rates of wages of the operatives might be lowered by the employment not only of full grown men, but also of their wives and children. Private manufacturers are aware that if the man be the only one to earn money for the support of his family, his wages must be high, that his wages may suffice for the maintenance of the whole. But if employment be likewise found for the wife and children, their earnings may be made to contribute to the general support of the whole, and the father's wages may be diminished nearly in proportion. Accordingly, in extensive private manufactories, it will be found that women and children find employment as well as men. At our naval arsenals, on the contrary, near which there exist but few private manufactories, no work is given to women or children, so that it is on the father alone the whole have to depend for sustenance; although in the fabrication of a great number of articles subservient to naval purposes, useful employment might easily be found for all the labour the

wives and children of the operatives could spare from their domestic business, so as to effect a saving to the public of at least a sixth part of the customary wages to the men.

I have heard it asserted, that in point of morality, women could not be employed by Government; from this opinion, however, I wholly dissent. In many manufactories females might be separated entirely from the men, were it thought necessary; although whoever is conversant with tolerably well regulated private manufactories, must be well convinced that it is not in the workshop immorality has been found; whilst those who have attended to the habits of the people at sea-ports, where our naval arsenals are placed, will no doubt acquiesce in the opinion I have formed, that youthful females, instead of being exposed to temptation, would be more likely to be withdrawn from it, were their time usefully employed under suitable inspection. In regard to the morals of the men too, those who are fathers of numerous families at least, were a portion of their children earning money, would not be exposed to that great temptation to peculation and mal-practices, so frequently known to be the case with men burthened with a numerous family.

In going through the subject of manufactories, I have had occasion to refer to a variety of documents not brought to notice, and it has happened on this, as on every former investigation, respecting the fabrication of articles on Government account, that my conviction has been strength-

ened, that by this means the greatest reduction of expense on the matériel may be the most easily effected. In my desire to learn on what grounds you and others may have entertained a contrary opinion, I have turned to the evidence which the Appendix to the Second Report of your Committee affords, in regard to manufactories in the Ordnance Department, and my inferences, in regard to the manufactories in that Department, are also the reverse of yours. It seems to me that some articles provided by the Ordnance are of a nature, the permanent goodness of which is so essential to efficiency, gunpowder above all, that were this defective, not only would our other preparations for war be useless, but the very lives of the military personnel would be in jeopardy—here indeed it is particularly apparent that “efficiency is true economy;” and, certainly, although an article of such importance, if fabricated under the due inspection which can only be obtained in a Government establishment, should cost more than a given weight of it could be procured for by contract, still it would be economy to manufacture it. It would appear, however, that articles manufactured by the Ordnance are cheaper than they can be bought of equal goodness. It is true, full details of accounts do not appear in the Appendix, yet, by examination of the abstracts there exhibited, I cannot doubt that many manufactories are carried on in this Department also with saving to the public. Indeed, the appearance these accounts exhibit, of having been abstracted from more de-

tailed ones, could not but excite some surprise if your Committee doubted Sir H. Hardinge's reiterated assertions, and the instances he adduced, of savings having arisen from this source, that your Committee should not have called for such details as should either have confirmed his opinion, or have afforded specific data and reasons for controverting it. It is not to be supposed that your Committee had previously made up an opinion on any subject that was to be brought under their investigation; and should any grounds have existed for the opinion you have formed which do not appear, I cannot possibly judge of their validity. But should any facts be adduced against the conclusions I have come to, I certainly shall not be the last either to enter into any needful investigations, or to change any opinions I have formed, whenever they may be in opposition to decided facts, or to well-grounded reasons.

I am, Sir,

Your very obedient Servant,

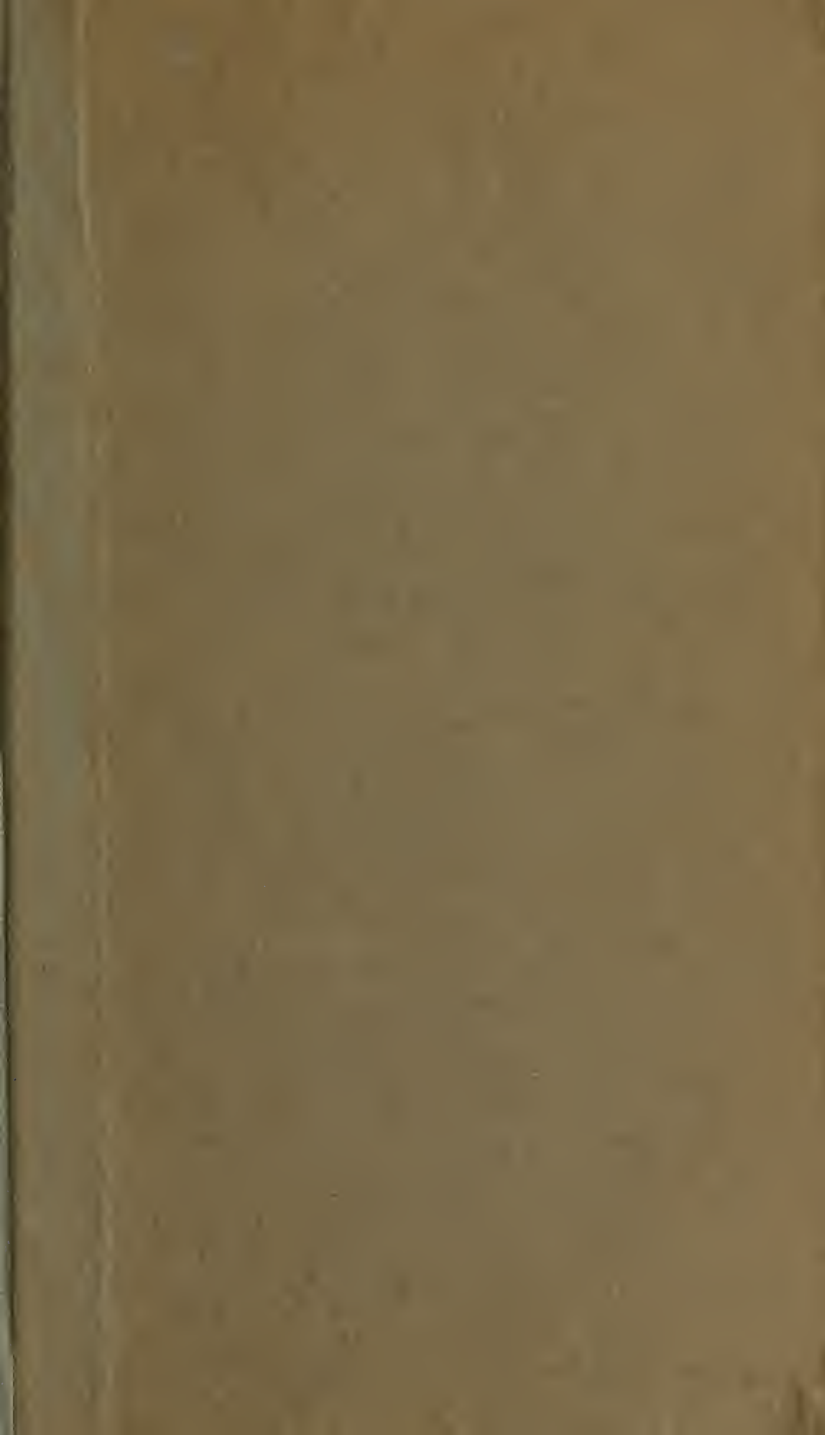
S. BENTHAM.

2, *Lower Connaught Place,*

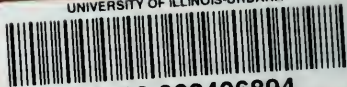
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